

shp April 20

Work Order ID 79632

\*79632\*

Page 1

February-01-12 11:19:16 AM

Item ID: D206-667-207BL

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Item Name: Crosstube Mid Aft

Stop \*NS2\*

Start Date: 30/01/2012 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals: Process Plan: M.L.J

Date: 12/02/01 Tooling:

Date:

Run Start \*NR1\*

QC:

Date: SPC (Y/N):

Date:

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D206-667-247	A (DEO)								
IIN-D206-667	D								
100		0.00							
*100*	DOCUMENT CONTROL								
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D206-667-207 chg 002								
110		0.00							
*110*	BENDING MACHINE - CROSSTUBES								
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D206-667-247 using CNC bender program D206-667-207								

for MLS 12-3-26

S.21312

JW  
RM  
12-3-12

W/O: 179632		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206-667-207BL PAR #: \_\_\_\_\_ Fault Category: X - tube NCR: Yes ☐ No ☒ DQA: 12/29 Date: 12/03/29  
 Resolution: use as is Disposition: use as is QA: N/C Closed: ck Date: 12/3/29

NCR: 12-1297		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.03.12	110	Crushing after bending is over tolerance	CP 12.03.12 PS1642	Acceptable based on attached SR	MA	S 12/03/12	CP 12.03.12 PS1642	S 12/03/12

NOTE: Date & initial all entries

**Work Order ID 79632****\*79632\***

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February-01-12 11:19:16 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

120

QC15- Crosstube Dimensional Check

0.00

**\*120\***

QC

Memo

0.00

S. 2/03/12

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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# Work Order ID 79632

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Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130

0.00

**\*130\***

Crosstubes

0.00

Crosstubes

Crosstubes

## Memo

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 and drill table DT8577 and tower holes #6 as per QSI0010 and as per Dwg D206-667-247. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247 Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT 8584 & DT8583 as per Dwg D206-667-247. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247

6-Drill Fwd rivet holes using drill Jig DT8787 as per Dwg D206-667-147. Note: Fwd side has 3x top holes.

7-Drill Aft rivet holes using drill Jig DT 8787 as per Dwg D206-667-247.

8-C'sink holes as per Dwg D206-667-247.

9 -Scribe part # and batch # using vibrating stylus as per Dwg D206-667-247 Inside of Cuff(Donot engrave on outside of tube)

10 -Deburr & Inspect for surface damage. Repair damage within limits as per

MO/RM 12-3-12

MO 12/3/12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 79632****\*79632\***

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February-01-12 11:19:16 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Mid Aft

Stop **\*NS2\***

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Dwg  
D206-667-247

140

Crosstubes Chemical Conversion

0.00

**\*140\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

150

QC3- Inspect Part Finish

0.00

**\*150\***

QC

Memo

0.00

Quality Control

160

QC5- Inspect part completeness to step on W/O

0.00

**\*160\***

QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**\*79632\***

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**\*N900040100\***

Setup Start \*NS1\*

Stop **\*NS2\***

**Reference:**

Run Start \*NR1\*

Stop \*NR2\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

170	Outsource process - NDT per QSI038 4.1	0.00
-----	--	------

Outsource2

### Outsource process - NDT

## Memo

Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: 14456  
LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

180	0.00
-----	------

**\*180\***

## Packaging

## Packaging

## Packaging

## Memo

Ensure copy of NDT results attached to work order.

190	QC5- Inspect part completeness to step on W/O	0.00
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**\*190\***

QC

## Quality Control

## Memo

Ensure results are as per Dwg D206-667-247

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

# Work Order ID 79632

**\*79632\***

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Item ID: D206-667-207BL

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**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200		0.00							
<b>*200*</b>	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	PRIME B <u>117319</u> DELFLEET BLUE B <u>118395</u> CLEAR DELFLEET B <u>118093</u>								
210		0.00							
<b>*210*</b>	QC14- Inspect Spray Paint								
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								
220		0.00							
<b>*220*</b>	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1-Install nut plates as per Dwg D206-667-247.								

A2 12-3-16

W 12-03-19 (1)

A2 12-3-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 79632****\*79632\***

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February-01-12 11:19:16 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Révision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
<b>*230*</b>	Skidtubes					<u>AB</u>	<u>12</u>	<u>3</u>	<u>22</u>
Crosstubes	<b>Memo</b>	0.00							
Crosstubes	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DSI9565 and QSI 015 A/R Proseal 890 Batch: <u>120867</u>								
	3- Torque bolts as per dwg								
240	QC5- Inspect part completeness to step on W/O	0.00							
<b>*240*</b>									
QC	<b>Memo</b>	0.00							
Quality Control									
250	Pick Kit	0.00							
<b>*250*</b>									
Packaging	<b>Memo</b>	0.00							
Packaging									

SP 12-03-26

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 79632****\*79632\***

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February-01-12 11:19:16 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

260

QC4- 100% Inspect kits for completeness

0.00

**\*260\***

QC

Memo

0.00

Quality Control

8/12/12

270

0.00

**\*270\***

Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D206-667-207

Location:

PPP Rev: ~~A~~

6/13/12

280

QC21- Final Inspection - Work Order Release

0.00

**\*280\***

QC

Memo

0.00

Quality Control

12/13/12

12-03-12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries



# Picklist Print

February-01-12 11:19:20 AM

Page 1

Work Order ID: 79632

**\*79632\***

Parent Item: D206-667-207BL

**\*D206-667-207BI \***

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: RevA 11.01.13 New Issue EC verified by:DD  
11.08.08 PER ECN 11-615 DD VERF:EC

IPP REV:B

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D206-667-247TRN

Manufactured

No

110

Each

2.0000

1

1

**\*D206-667-247TRN\***

**\*\***

Crosstube Assembly, Mid Aft

Location

Loc Qty

Loc Code

LG

79667

2

78672

1

78906

1

①

MO

12/3/12

D2873-043

Manufactured

No

220

Each

26.0000

2

2

**\*D2873-043\***

**\*\***

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

80228

26

72644

2

73605

4

75010

20

②

AS

12-3-19

D2873-045

Manufactured

No

220

Each

19.0000

2

2

**\*D2873-045\***

**\*\***

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

80162

19

74985

19

AS

12-3-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Page 2

Work Order ID: 79632

Parent Item: D206-667-207BL

Parent Item Name: Crosstube Mid Aft

\*79632\*

\*D206-667-207BL \*

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W10

Purchased

No

220

Each

137.0000

14

14

\*MS20601-AD4W10\*

RIVET

\*\*

AS 12-3-19

Location

Loc Qty

Loc Code

LG051

137

118675

37

19386

100

D2892-1

Manufactured

No

230

Each

14.0000

2

2

\*D2892-1\*

Support

\*\*

AS 12-3-19

Location

Loc Qty

Loc Code

LG052

14

72483

14

D3595-063-450

Manufactured

No

230

Each

102.1095

4

4

\*D3595-063-450\*

RUBBER CUSHION

\*\*

AS 12-3-19

Location

Loc Qty

Loc Code

MAT052

102.109474

67353

2

68893

6

70113

0.56

71354

0.2

74113

0.349474

75597

13

77678

80

4

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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\*79632\*

Parent Item: D206-667-207BL

\*D206-667-207BL \*

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-22

Purchased

No

230

Each

68.0000

4

4

\*MS21920-22\*

Clamp(per MIL-DTL-8783C)

\*\*

AB 12-3-19

## Location

## Loc Qty

## Loc Code

LG

50

119545

50

4

LG050

18

116207

7

117506

1

118186

10

AN5-10A

Purchased

No

250

Each

436.0000

10

10

\*AN5-10A\*

Bolt

\*\*

M20770. SP

## Location

## Loc Qty

## Loc Code

ST337

436

118191

80

119547

256

119981

100

AN5-32A

Purchased

No

250

Each

274.0000

4

4

\*AN5-32A\*

Bolt

\*\*

SP 12-03-26 SP

## Location

## Loc Qty

## Loc Code

ST339

274

118422

2

118628

22

118983

25

119328

100

119862

50

120423

75

SP

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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\*79632\*

Parent Item: D206-667-207BL

\*D206-667-207BI \*

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

250

Each

106.0000

4

4

\*AN5-34A\*

Bolt

\*\*

1/11/11 SP

SP

SP

Location

Loc Qty

Loc Code

ST339

106

117794

26

119328

30

120422

50

4A

AN960JD516

NAS1149D0563J

Purchased

No

250

Each

0.0000

18

18

\*AN960.ID516\*

Washer

\*\*

M119717 SP

SP

SP

MS21042L5

Purchased

No

250

Each

1,916.000

4

4

\*MS21042I 5\*

Nut

\*\*

SP

12-03-26 SP

SP

Location

Loc Qty

Loc Code

ST300

1916

116105

5

116548

43

117611

46

118179

322

119109

1500

4x

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



Item	Qty	Part Number	Description
	-247		
1	X	D206-667-247	CROSSTUBE ASSEMBLY (206L MID AFT)
2	1	D6004-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2892-1	SUPPORT
6	4	D3595-063-450	RUBBER CUSHION
7	4	MS21920-22	CLAMP
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6004-115  
FINISHED LENGTH = 99.76±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-247" AND BATCH NUMBER ON  
INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS).
- 7) WEIGHT: 21.1 lbs (-607 = 17.7 lbs)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY.  
TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 10 PASSES. MAXIMUM TUBE FLATTENING DUE  
TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI  
015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-22 CLAMPS WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE  
D2892-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE  
LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

UNCLASSIFIED  
DATE 12/02/01 BY 79632 HLT

DEO ATTACHED

BCW #11-615  
11.07.28

UNDER REVIEW

RELEASED  
2011-05-24

A NEW ISSUE		CP	10.12.23
REV.	DESCRIPTION	BY	DATE
DESIGN	99		
DRAWN	99		
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.12.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D206-667-247	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASS'Y (206L MID AFT)	SCALE NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

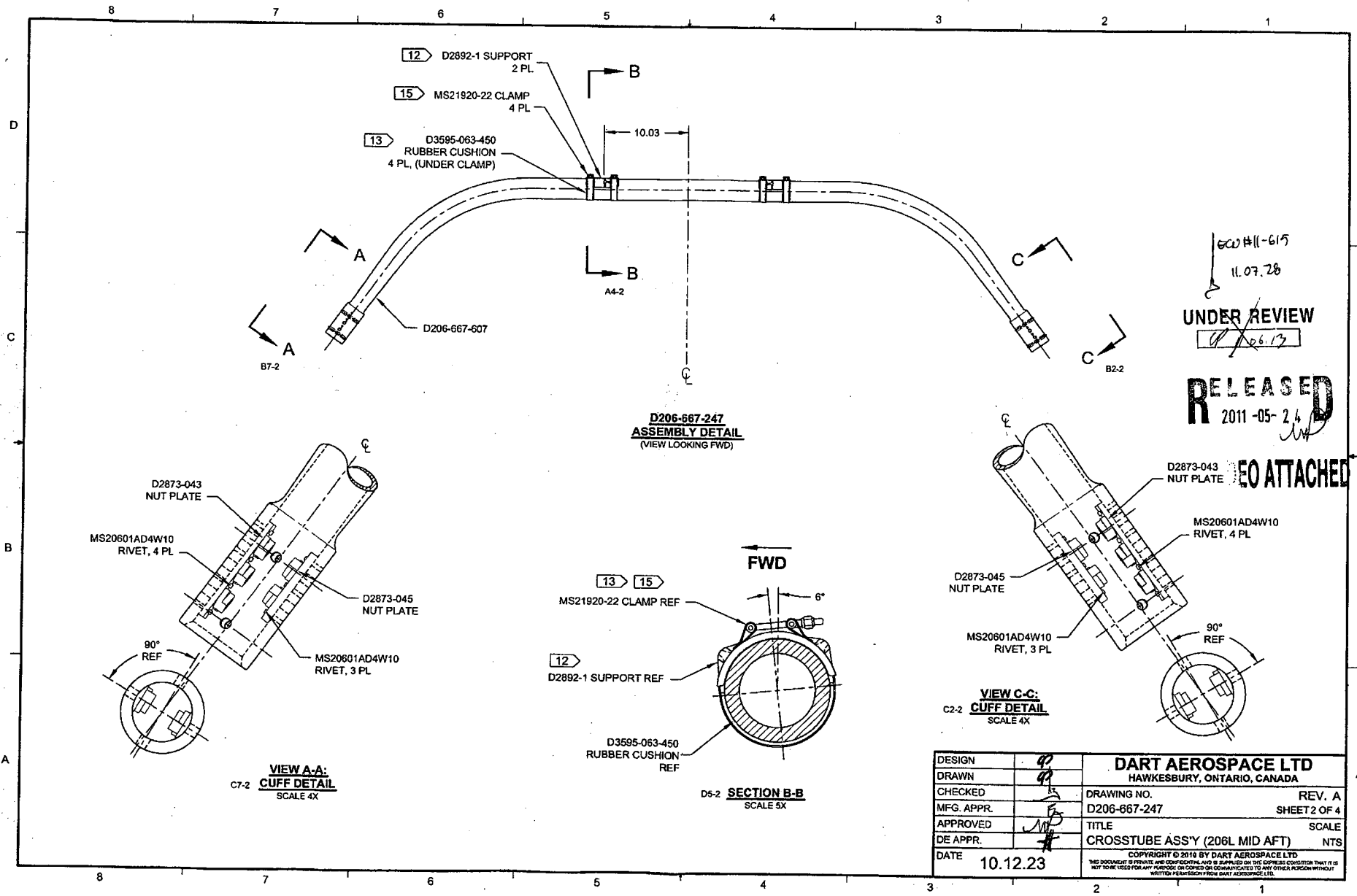
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79632



60W #11-615  
11.07.28

**UNDER REVIEW**

**RELEASED**  
2011-05-24

**EO ATTACHED**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

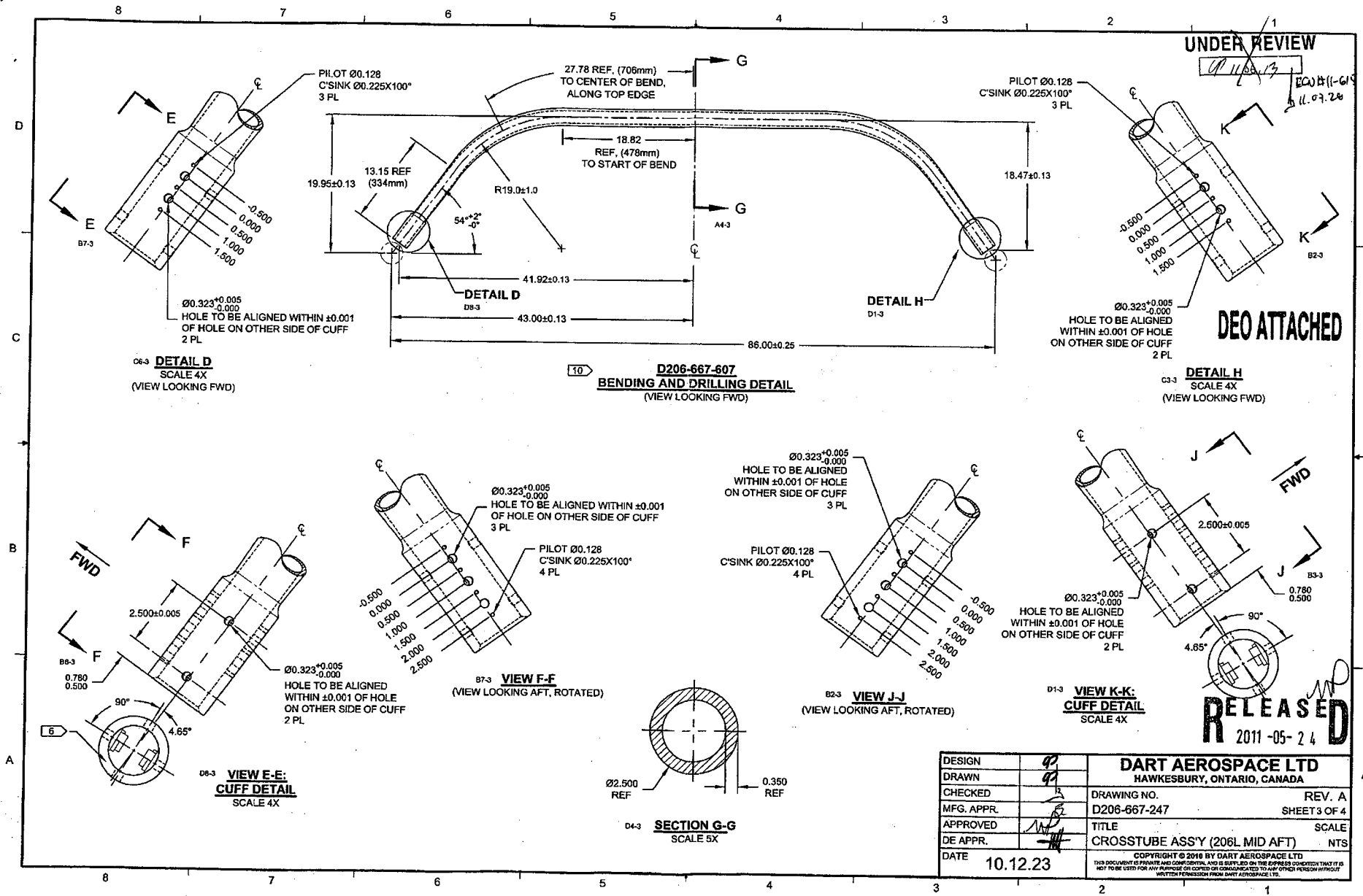
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79632



UNDER REVIEW

DEO ATTACHED

RELEASED  
2011-05-24

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D206-667-247	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (206L MID AFT)	NTS
DATE	10.12.23	COPYRIGHT © 2010 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY FORM OR BY ANY MEANS WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

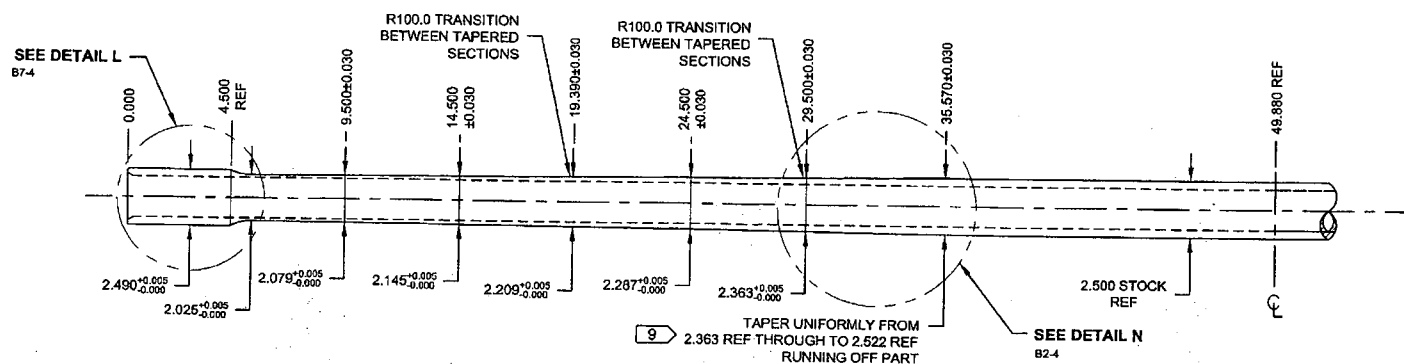
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

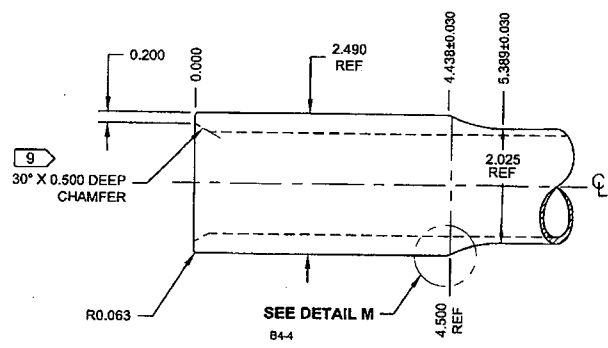
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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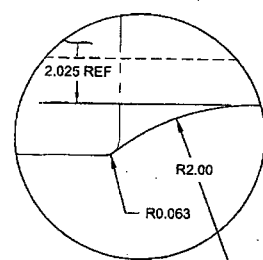
79632



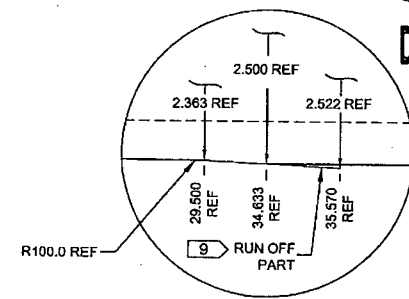
**TURNING DETAIL**



**DETAIL L: CROSSTUBE CUFF**  
SCALE 2.5X



**DETAIL M: CUFF TRANSITION**  
NOT TO SCALE



**DETAIL N: TAPER RUN-OFF**  
NOT TO SCALE

800#4-615  
11.07.28  
**UNDER REVIEW**  
P. 1.06.13

**DEO ATTACHED**

**RELEASED**  
2011-05-24

DESIGN	99	<b>DART AEROSPACE LTD</b>	
DRAWN	99	HAWKESBURY, ONTARIO, CANADA	
CHECKED	99	DRAWING NO.	REV. A
MFG. APPR.	99	D206-667-247	SHEET 4 OF 4
APPROVED	99	TITLE	SCALE
DE APPR.	99	CROSSTUBE ASSY (206L MID AFT)	NTS
DATE	10.12.23	COPYRIGHT © 2010 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



79632

DRAWING NO. D206-667-247	TITLE CROSSTUBE ASS'Y (206L MID AFT)	REV. A	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D206-667-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN qp	CHECKED ASS	MFG. APPR. KD	APPROVED JMD		DE APPR. H		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL

**CHANGE:**

IS:

Item	Qty -247	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2892-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-07-28  
JMD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

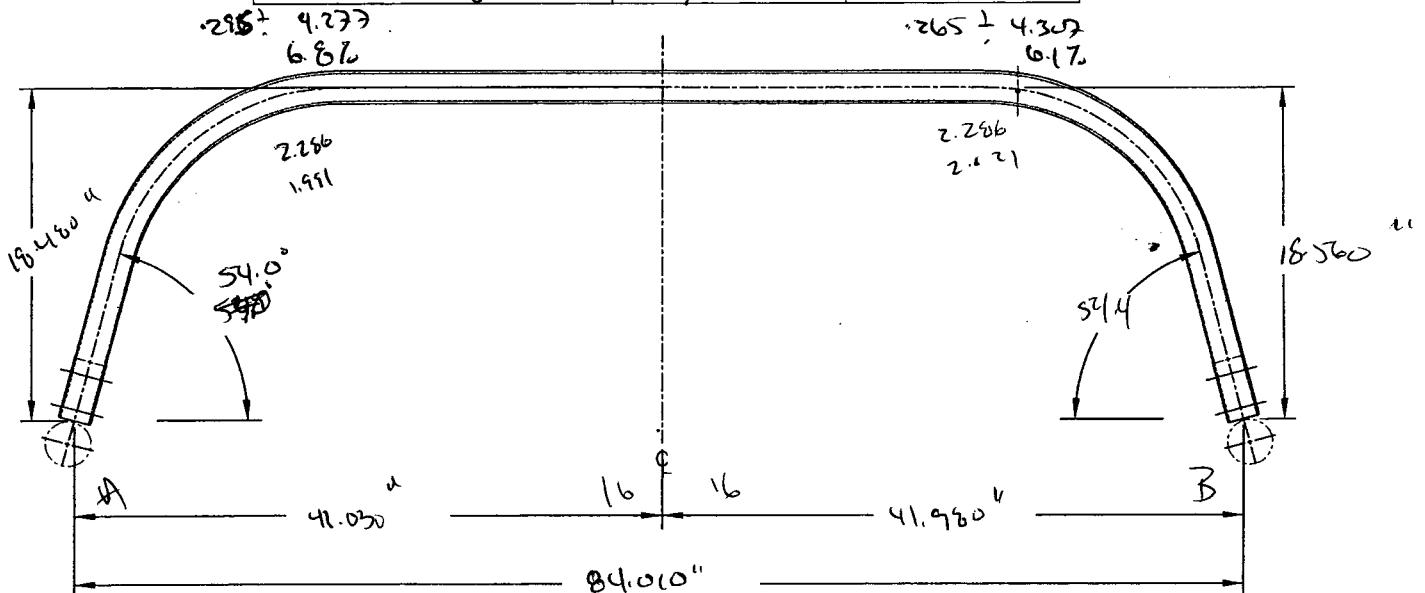
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 79632
<b>Description:</b> D206L min. AH	<b>Part Number:</b> D206-667-207
<b>Inspection Dwg:</b> D206-667-207	<b>Rev:</b> A
	<b>Page 1 of 1</b>

Required Dimension	Min	Max
18.47 Height $\pm .130$	18.340"	18.600"
41.92 1/2 Span $\pm .130$	41.790"	42.050"
54° Angle $\pm 3$	54°	56°
83.64 Total Span $\pm .250$	83.590	84.090
Bending Passes	10	
Crushing	/	6%



	Side A	Side B
Bending Passes	16 Passes	16 Passes
Crushing	6.87%	6.17%
Comments		

QC15 Inspection	S
Date	12/03/12

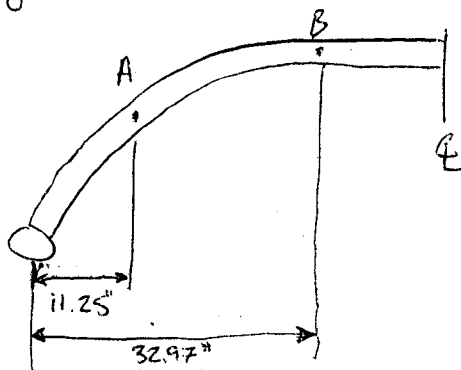
Rev	Date	Change	Revised by	Approved
A		New Issue		
B	06.09.19	Reformat; QC level revised	KJ/JM	
C	07.02.06	Reformat	KJ/JM	
D	12.02.15	Added bending passes and crushing	KJ	
E	12.03.07	Revised comments table	KJ	



12.01.13

CRUSHING OF D206-667-247

Acceptability of <sup>7.3</sup>8% CRUSHING AT END OF BEND



POINT A:  $OD_1 = 2.283$   $OD_2 = 1.973$   
 $CRUSHING = (2.283 - 1.973) / (2.283 + 1.973) = 7.3\%$   
 $I = 0.435 \text{ in}^4$  FROM AUTOCAD

POINT B:  $OD = 2.50 \text{ in}$   $ID = 1.80 \text{ in}$   
 $I = 1.402 \text{ in}^4$

A:  $F = Mc/I = P \times 11.25 \times 1.973 / 2 \times 0.435 = 13.52 P$   
 B:  $F = P \times 32.97 \times 2.50 / 2 \times 1.402 = 29.39 P$

M.S. =  $29.39 / 13.52 - 1 = 1.17$

∴ Tube will break at support before area of <sup>7.3</sup>8% crushing. <sup>7.3</sup>8% crushing in area at end of bend is acceptable.

CP 12.01.13



# LIQUID PENETRANT TEST REPORT

P# 14910

CLIENT	<u>Dart Aerospace</u>	DATE	<u>March 15/12</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>LINDA LACELLE</u>	ACUREN JOB NO.	<u>188-12-00067</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN</u> <u>HAWKESBURY, ON.</u>	PO/NO.		WORK LOCATION	<u>HAWKESBURY</u>		
PROJECT	<u>F.P.T. on CROSS TUBES AND MACHINED PARTS</u>	ACCEPTANCE STD.	<u>ASTM 1417/01-08</u>	REV./DATE	<u>2005</u>		
ITEM(S) EXAMINED	<u>(2) CROSSTUBES</u> <u>(4) MACHINED SLEEVES</u>						

JOB DESCRIPTION	PROCEDURE NO.	LT-202 REV./DATE	2008	TECHNIQUE NO.	LT-1412 REV./DATE	2008
PART NO.	<u>SEE RESULTS</u>	MATERIAL	<u>STAINLESS STEEL</u>	THICKNESS	<u>VARIABLE</u>	
SCOPE	<u>ADHESIVE FLUORESCENT LIQUID PENETRANT INSPECTION</u> <u>WAS CARRIED OUT ON 100% EXTERNAL SURFACE.</u>					

TEST DETAILS	
METHOD	<input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE
FAMILY BRAND	<u>Ultracolor</u>
PENETRANT	<u>2407</u> MINIMUM DWELL TIME <u>450</u> MIN.
PENETRANT REMOVER	<u>H2O</u> MINIMUM DRY TIME <u>&gt;10</u> MIN.
DEVELOPER	<u>34052</u> MINIMUM DWELL TIME <u>10</u> MIN.
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY
<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED BLACK LIGHT S/N <u>18459</u> <input type="checkbox"/> OUTPUT > 1000 $\mu$ W/CM <sup>2</sup> <input type="checkbox"/> AMBIENT < 2 fc LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE OTHER LIGHT METER S/N <u>1038866</u> CAL DUE DATE <u>2/14/12</u>	

TEST SURFACE	
SURFACE CONDITION	<input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input checked="" type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F <input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F

RESULTS-	<input type="checkbox"/> METRIC <input checked="" type="checkbox"/> IMPERIAL
<p>W.O. #</p> <p>1 73724 - CROSSTUBE ✓ - HAD BEEN REWORKED PREVIOUS</p> <p>1 78577 - CROSSTUBE ✓</p> <p>1 78578 - CROSSTUBE ✓</p> <p>1 79633 - CROSSTUBE ✓</p> <p>1 79632 - CROSSTUBE ✓</p> <p>1 76247 - CROSSTUBE ✓</p> <p>1 76246 - CROSSTUBE ✓</p> <p>1 78307 - SLEEVE'S ✓</p> <p>8.1763/16</p>	

**Scope of Services**  
The agreement by Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

**Standard of Care**  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES	
CLIENT REPRESENTATIVE	<u>Andrew Sheldon</u> <u>Sheldon</u>
TECHNICIAN (SIGNATURE):	<u>Mike Johnston</u>
NAME (PRINT):	<u>Mike Johnston</u>
1 <sup>st</sup> TECHNICIAN	2 <sup>nd</sup> TECHNICIAN
CGSB LEVEL <u>II</u> SNT LEVEL <u>3E</u>	CGSB LEVEL <u>II</u> SNT LEVEL <u>3E</u>
CGSB REG. NO <u>6608</u>	CGSB REG. NO <u>6608</u>
DTR #	<u>E-68717</u>
REPORT REVIEWED BY:	<u>Mike Johnston</u>
NAME	INITIALS